I claim:

1.   A switching module for a data communication switch having a plurality of

switching modules interconnected over a backplane, comprising:

a first port for receiving packet data including a source address and a destination

5   address;

means for checking whether a source association between the source address and

the first port has been made; and

means for making the source association and providing source association

information to other switching modules,

10   wherein the means for making the source association makes the source association

when the source association has not been made.

2.   The switching module of claim 1, further comprising:

means for checking whether a destination association between the destination

address and a second port has been made; and

15   means for making the association while current packets are flooded over a

multicast queue.

3.   The switching module of claim 2, wherein when the destination association has

been made, packets are transitioned from traversing the multicast queue to a unicast

queue.

20   4.   A method for communicating data over a switch having a plurality of switching

modules interconnected over a backplane, each switching module having a capability to

perform source learning, the method comprising the steps of:

receiving a packet on a first port, the packet including a source address and a

destination address;

determining whether the source address is associated with the first port;

determining whether the destination address is associated with a second port;

5   determining a flow state;

storing the packet; and

transmitting the packet when a specified bandwidth is available at a specified

priority for a specified port.

5.   The method of claim 4 further comprising the step of: specifying the port,

10 the priority and the bandwidth for the packet if the flow state is neither "last multicast

packet" nor "first unicast packet."

6.   The method of claim 5, wherein the step of storing the packet comprises

the step of storing the packet in a unicast queue until the specified bandwidth is available

at the specified priority for the specified port.

15   7.   The method of claim 6 further comprising the step of checking to ensure

that a lock bit in a unicast packet buffer has been cleared when the specified bandwidth is

available at the specified priority for the specified port.

8.   The method of claim 7 further comprising the step of performing a check

to ensure that a lock bit in a lock table has been cleared before the packet is transmitted if

20 the lock bit in the unicast packet buffer has not been cleared.

9.   The method of claim 4 further comprising, if the flow state is "last

multicast packet", the steps of: defining the packet for flooding; setting a lock bit in a

multicast packet buffer; and changing the flow state to "first unicast packet."

10. The method of claim 9 further comprising the step of specifying the port, the priority and the bandwidth for the packet.

11. The method of claim 10 further comprising the step of setting a lock bit in a lock table if the lock bit is set in the multicast packet buffer.

12. The method of claim 11, wherein the step of storing the packet comprises the step of storing the packet in a multicast queue until the specified bandwidth is available at the specified priority for the specified port.

13. The method of claim 12 further comprising the step of clearing the lock bit in the lock table when the packet is transmitted.

14. The method of claim 13 further comprising the step of sending the packet to a source learning element if the source address is not associated with the first port.

15. The method of claim 14 further comprising the step of source learning in which the source address is associated with the first port and association information is stored for inquiries or transmittal.

16. The method of claim 4 further comprising the step of setting a lock bit in a unicast packet buffer if the flow state is "first unicast packet."

17. The method of claim 16 further comprising the step of specifying the port, the priority, and the bandwidth for the packet.

18. The method of claim 17, wherein the step of storing the packet comprises the step of storing the packet in a unicast queue until the specified bandwidth is available at the specified priority for the specified port.

19.   The method of claim 18 further comprising the step of performing a check to ensure that the lock bit in the unicast packet buffer has been cleared before the packet is transmitted.

20.   The method of claim 19 further comprising the step of performing a check to ensure that a lock bit in a lock table has been cleared before the packet is transmitted, if the lock bit in the unicast packet buffer has not been cleared.

21.   The method of claim 4 further comprising the step of tagging the packet for source learning if the source address is not associated with the first port.

22.   The method of claim 21 further comprising the step of associating the destination address with the second port if the destination address is not associated with the second port.

23.   The method of claim 22 further comprising, if the flow state is "last multicast packet," the steps of defining the packet for flooding, setting a lock bit in a multicast packet buffer, and changing the flow state to "first unicast packet."

24.   The method of claim 23 further comprising the step of specifying the port, the priority, and the bandwidth for the packet.

25.   The method of claim 24 further comprising the step of setting a lock bit in a lock table if the lock bit is set in the multicast packet buffer.

26.   The method of claim 25, wherein the step of storing the packet comprises the step of storing the packet in a multicast queue until the specified bandwidth is available at the specified priority for the specified port.

27.   The method of claim 26 further comprising the step of clearing the lock bit in the lock table when the packet is transmitted.

28.   The method of claim 27 further comprising the step of sending the packet to a source learning element if the source address is not associated with the first port.

29.   The method of claim 28 further comprising the step of source learning in which the source address is associated with the first port and association information is stored for inquiries or transmittal.

30.   The method of claim 22 further comprising the step of setting a lock bit in a unicast packet buffer if the flow state is "first unicast packet."

31.   The method of claim 30 further comprising the step of specifying the port, the priority, and the bandwidth for the packet.

32.   The method of claim 31 wherein the step of storing the packet comprises the step of storing the packet in a unicast queue until the specified bandwidth is available at the specified priority for the specified port.

33.   The method of claim 32 further comprising the step of performing a check to ensure that the lock bit in the unicast packet buffer has been cleared before the packet is transmitted.

34.   The method of claim 33 further comprising, if the lock bit in the unicast packet buffer has not been cleared, the step of performing a check to ensure that a lock bit in a lock table has been cleared before the packet is transmitted.

35.   The method of claim 34 further comprising the step of sending the packet to a source learning element if the source address is not associated with the first port.

36.   The method of claim 35 further comprising the step of source learning in which the source address is associated with the first port and association information is stored for inquiries or transmittal.

37.   The method of claim 22 further comprising the step of: specifying the port, the priority, and the bandwidth for the packet if the flow state is neither "last multicast packet" nor "first unicast packet."

38.   The method of claim 37 wherein the step of storing the packet comprises the step of storing the packet in a unicast queue until the specified bandwidth is available at the specified priority for the specified port.

39.   The method of claim 38 further comprising the step of performing a check to ensure that a lock bit in a unicast packet buffer has been cleared before the packet is transmitted.

40.   The method of claim 39 further comprising the step of performing a check to ensure that a lock bit in a lock table has been cleared before the packet is transmitted, if the lock bit in the unicast packet buffer has not been cleared.

41.   The method of claim 40 further comprising the step of sending the packet to a source learning element if the source address is not associated with the first port.

42.   The method of claim 41 further comprising the step of source learning in which the source address is associated with the first port and association information is stored for inquiries or transmittal.

43.   The method of claim 4 further comprising, if the destination address is not associated with the second port, the steps of defining the packet for flooding; and notifying a source learning element.

44.   The method of claim 43 further comprising the step of specifying the port, the priority, and the bandwidth for the packet.

45. The method of claim 44 further comprising the step of setting a lock bit in a lock table if a lock bit is set in a multicast packet buffer.

46. The method of claim 45 wherein the step of storing the packet comprises the step of storing the packet in a multicast queue until the specified bandwidth is available at the specified priority for the specified port.

47. The method of claim 46 further comprising the step of clearing the lock bit in the lock table when the packet is transmitted.

48. The method of claim 47 further comprising the step of sending the packet to a source learning element if the source address is not associated with the first port.

49. The method of claim 48 further comprising the step of source learning in which the source address is associated with the first port and association information is stored for inquiries or transmittal.

50. The method of claim 43 further comprising the step of searching for the destination address while packets are being flooded.

51. The method of claim 50 further comprising, when the destination address has been found, the steps of: specifying the port, the priority, and the bandwidth for the packet; storing the association between the destination address and the second port; and setting the flow state to "last multicast packet."

52. The method of claim 21 further comprising, if the destination address is not associated with the second port, the steps of: defining the packet for flooding; and notifying a source learning element.

53. The method of claim 52 further comprising the step of specifying the port, the priority, and the bandwidth for the packet.

54.   The method of claim 53 further comprising the step of setting a lock bit in

a lock table if a lock bit is set in a multicast packet buffer.

55.   The method of claim 54 wherein the step of storing the packet comprises

the step of storing the packet in a multicast queue until the specified bandwidth is

5   available at the specified priority for the specified port.

56.   The method of claim 55 further comprising the step of clearing the lock bit

in the lock table when the packet is transmitted.

57.   The method of claim 56 further comprising the step of sending the packet

to a source learning element if the source address is not associated with the first port.

10   58.   The method of claim 57 further comprising the step of source learning in

which the source address is associated with the first port and association information is

stored for inquiries or transmittal.

59.   The method of claim 52 further comprising the step of searching for the

destination address while packets are being flooded.

15   60.   The method of claim 59 further comprising, when the destination address

is found, the steps of: specifying the port, the priority, and the bandwidth for the packet;

storing the association between the destination address and the second port; and setting

the flow state to "last multicast packet."

61.   A data communication switch, comprising:

20   a plurality of switching modules;

           a backplane coupled to the switching modules for exchanging packet data

originated by and destined to external network devices; and

a control path coupled to the switching modules for exchanging control data originated by and destined to the switching modules wherein the control data includes information regarding associations between external network devices and ports of the data communication switch.

5   62.   The data communication switch of claim 61, wherein the switching module comprises:

an access controller having a port for receiving a packet including a destination address and source address;

a switching controller coupled to the access controller for receiving the

10   packet from the access controller and processing it;

a queue controller coupled to the switching controller for receiving the packet from the switching controller,

wherein the queue controller transmits a first plurality of values to a first element in response to the packet, and receives a source address and a first port

15   association from the first element in response to the first plurality of values, transmits a second plurality of values to a second element in response to the packet, and receives a destination address and a second port association from the second element in response to the second plurality of values, transmits a third plurality of values to a third element in response to the packet, and receives a port, a priority, and a bandwidth from the third

20   element in response to the third plurality of values, and transmits the packet using a unicast queue, the destination address, the port, and the priority.

63.   The data communication switch of claim 62, wherein the queue controller transmits a fourth plurality of values to a fourth element if the source address and first

port association are not received in response to the first plurality of values, and wherein

the queue controller receives the source address and first port association from the fourth

element in response to the fourth plurality of values.

64.   The data communication switch of claim 63, wherein the queue controller

5   transmits the packet using a multicast queue and transmits a fifth plurality of values to the

fourth element if the destination address and the second port association are not received

in response to the second plurality of values, and wherein the queue controller receives

the destination address and the second port association from the fourth element in

response to the fifth plurality of values, delays the packet flow, and transmits the packet

10   using a unicast queue.